

TITLE: BIOTERRORISM

NAME:

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Introduction:

Bioterrorism is the unlawful use of living organisms and other toxins ensuing from nature to produce lethal sicknesses in plants, animals & Humans. The implementation alerts and associates government, Environment or colonies chasing political, clinical and ideological goals.

Bioterrorism is the measured and intentional use of pathogenic microbial strains, such as bacteria, viruses, or their toxins, for the mass spread of life-threatening diseases to devastate the population of an area. (s.2008)

Historical perspectives

- 1st used during 6th century B.C impurity of water reserve with fungus *Claviceps purpurea*(rye ergot)
- 1346: flinging of deceased bodies of plague victims to spread plagues
- 1767: spreading of smallpox by polluted blankets
- Yellow rain: mycotoxins (fungal toxins) used in Afghanistan
- 1984: The most notable biological attack in the United States was the planned *Salmonella* contamination of a restaurant salad bar.

The potential agents of bioterrorism are extensive, Microorganisms, diseases and impurities. General characteristics of this varied group formulations include:

- (1) aerosol dispersibility Particles 1-5 mm in size capable of penetrating distal bronchioles
- (2) the capability to supply these atomizers with simple technology
- (3) the possibility of these agents if provided from a linear foundation; (e.g. aircraft) downwind of the target infecting a large population
- (4) the capability to extend infection; illness, panic and anxiety

BIOWEAPON-RELATED DISEASE

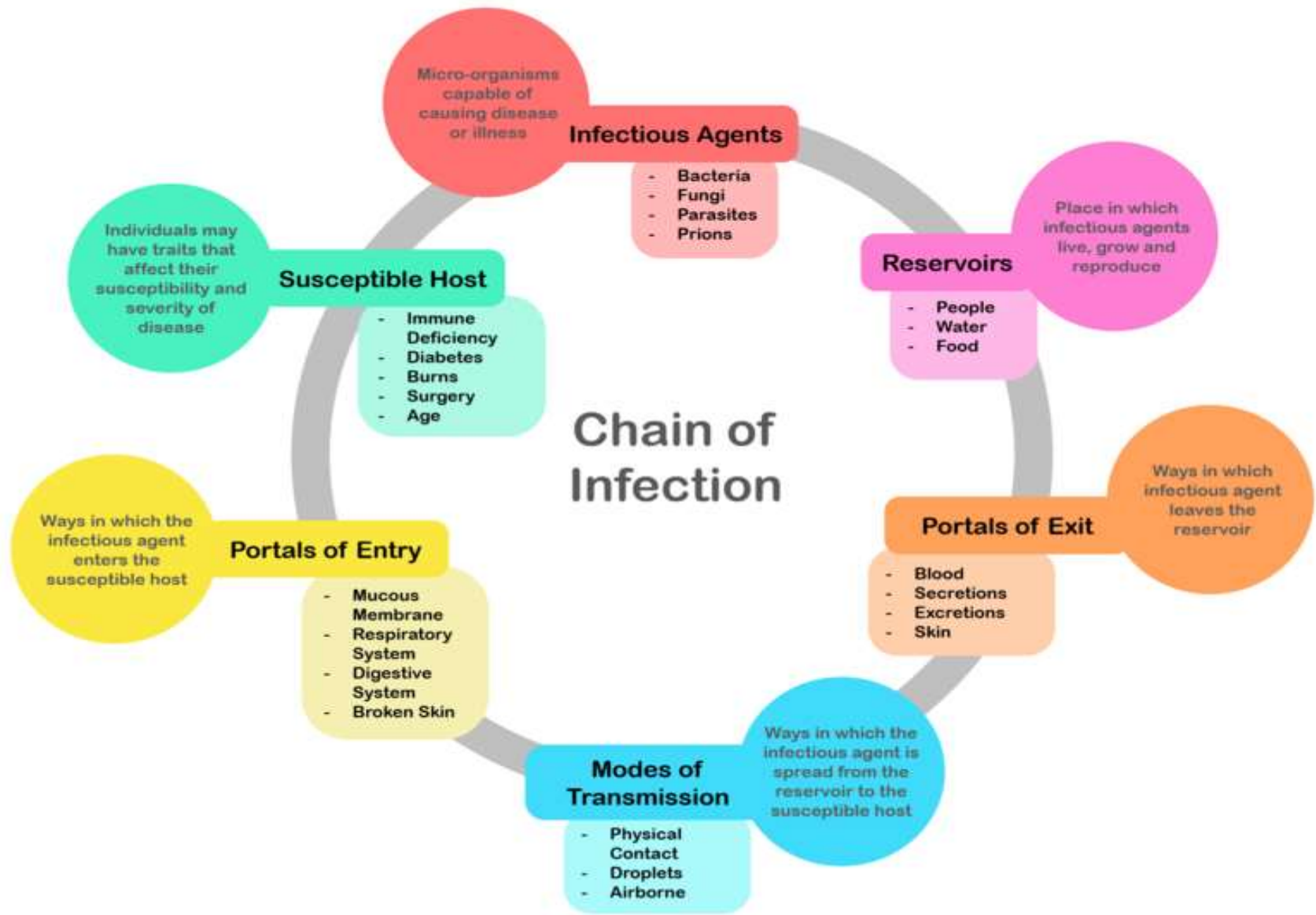
- ANTHRAX
- BOTULISM
- BRUCELLOSIS
- CHOLERA
- FOOD POISONING
- GLANDERS
- HEMORRHAGIC FEVER
- LASSA FEVER
- MELOIDOSIS
- PLAGUE
- PSITTACOSIS
- Q-fever
- Shigellosis
- Smallpox
- Tularemia
- Typhoid fever
- Typhus
- Viral encephalitis

ADDITIONAL POTENTIAL PATHOGENS

- Chlamydia pittance
- Cryptosporidium parvum
- Escherichia coli 0157:h7
- Hantavirus
- Salmonella species
- Shigella species
- Vibrio cholera

CLASSIFYING BIOTERROR AGENTS

- Class A: transferable Long shelf life and high public health impact Anthrax, botulism, smallpox, tularemia, plague
- Class B: Moderately Easy Some indicators of morbidity and mortality typhus, water safety hazard, salmonella
- Class C: easy to get Easily produced and deployed high probability of death



Plague as a biological weapon

- Suspicious incidents-pneumonic plague outbreak, Surat
bubonic outbreak, bleed
- Potential of being used as a bioweapon- “pneumonic plague.”
- 150,000affected-36,000 deaths
- 876 presumptive cases, 54fatalities
- Plague in a non-endemic area
- Previously eligible individuals with severe community-acquired pneumonia. Especially if you have hemoptysis

Reasons to suspect plague biological weapon

- Infectious diseases in non-endemic areas
- Infectious diseases without the formation of a common bubo
- Previously healthy individuals with severe community-acquired pneumonia, especially if hemoptysis is present
- Previously healthy individuals with a disease such as septic shock.
- Community-acquired pneumonia caused by Gram-negative bacilli.
- “rodent die-off.”
- Large no. of CAP than expected
- Large no. of a septic shock than expected

CDC Case classification of plague

- **Suspected case**

Clinically well-matched circumstances lacking possible or positive laboratory results

- **Probable case**

Clinically well-matched situations with available possible laboratory results

- **Definite case**

Clinically compatible case with available confirmatory laboratory results

- **Presumptive diagnosis**

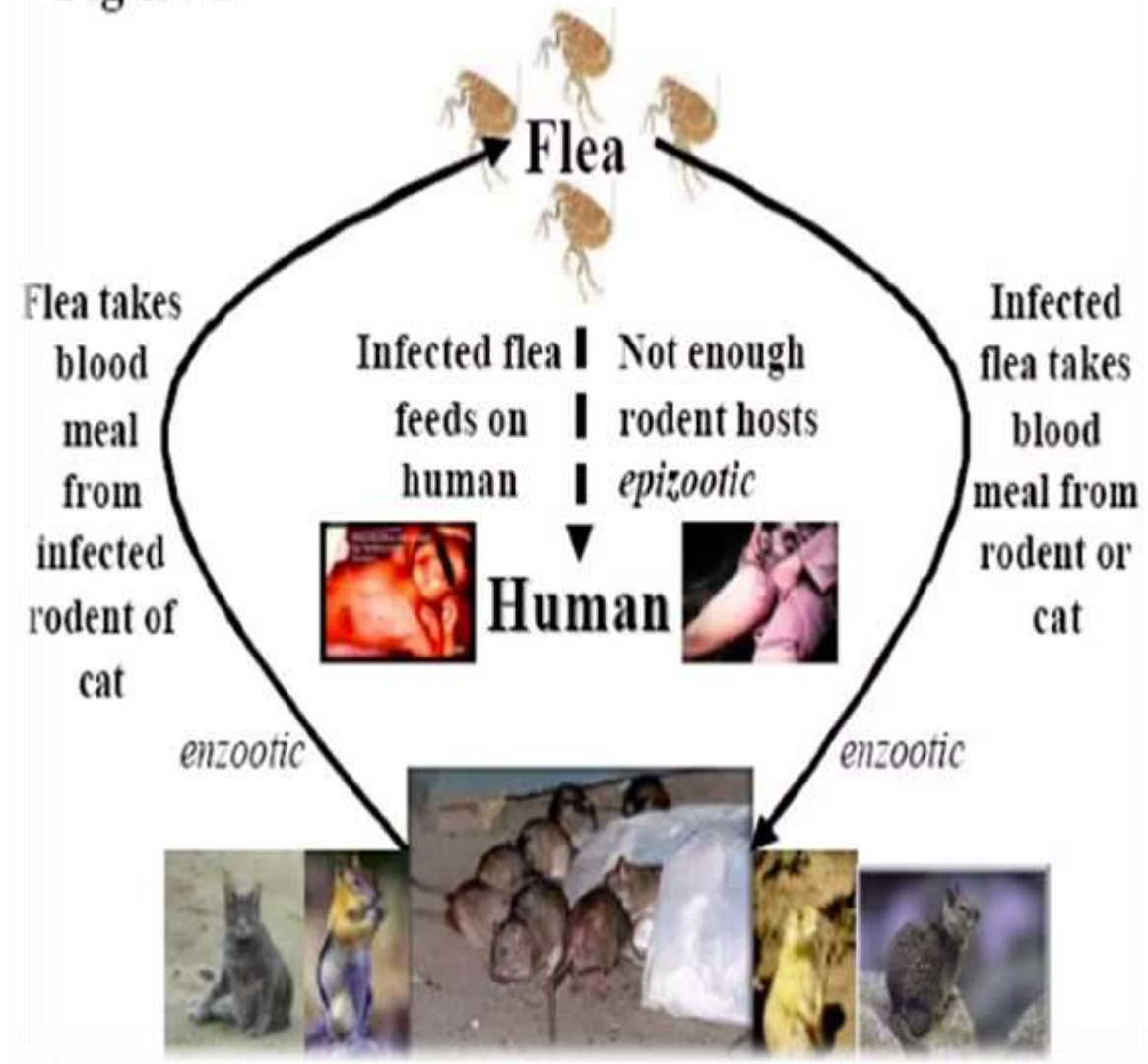
Detection of f1 antigen serum AB titre to F1 antigen without a history of plagueaccin

- **Confirmatory diagnosis**

isolation\ 4 fold increase in titre of serum AB to F1 Ag

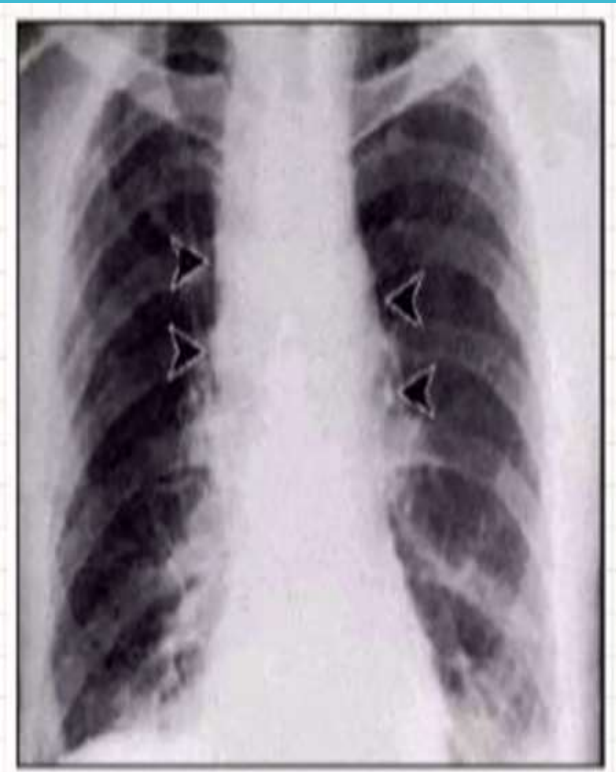
Figure 2

Spread of *Yersinia pestis*



Anthrax: Natural epidemiolog y

- Caused by *Bacillus anthracis*
- Spore form is highly resistant to physical and chemical agents
- Present in the soil in many areas, including the United States and Canada (1.9% of samples in the endemic area recently. Associated with anthrax carcasses.
- Spordia cases are still reported from Asia, Africa, Europe, and America
- Genome and virulence plasmids have been sequenced
- In the United States:
 - 224 cases of cutaneous anthrax were reported between 1944 and 1992
 - Until October 2001, only 5 human cases were reported after 1981 and none since 1992, all cutaneous.
 - Only 18 cases of inhalational anthrax were reported in the 20th century, all professionally reported.



- Begins as a small pimple or papule
- By day 2: a ring of small vesicles appears around the central pimple. These are initially clear but subsequently, turn blue or hemorrhagic
- Day 3-4: black eschar enlarging to cover vesicles. No pus unless superinfected
- Day 5-6: thick, black eschar firmly adherent
- Average incubation period: 1-5 days (as long as 45)
- Early: flu-like symptoms
- Late: respiratory distress, sepsis
- Chest x-ray: Mediastinal widening in a healthy patient is pathognomonic

Anthrax: Treatment

- Ciprofloxacin and doxycycline pending susceptibility
- Penicillin and doxycycline if sensitive
- Vaccination on days 0,14 and 28
- Antibiotic continued until day 28 if vaccinated or day 60 if not
- Corticosteroids may be considered for severe cutaneous anthrax or tracheal oedema
- Amthrax Vaccine Adsorbed (AVA) is the only certified vaccine in the U.S. it is prepared from a cell-free filtrate containing no living or dead organisms. The protective response is seen after three weeks. (P.M.2011)

Anthrax: what is the Level of Risk?

- Is the agent available? Yes. Unlike smallpox, anthrax bacillus is ubiquitous and easily stored.
- Can it be weaponised? Yes. It is thought that 17 countries are experimenting with it as a biological weapon. Many, including the U.S. in the 1950s and Iraq in the Gulf war, have done this.

Brucellosis

- Brucellosis is an infectious disease caused by bacteria. Contaminated animals and products can cause this disease.
- Transmissions could occur by eating raw meat or drinking unpasteurised milk.
- Toxins ingested or potentially aerosolised in a bioterrorism event. The LD50 (lethal dose for 50% of test animals) for type A is 0.001 µg/ml/kg.
- <1% mortality is reported as the outcome of brucellosis as a bioterrorism agent

Biological battle against brucellosis

- Most poisonous substance is known.
- LD 50-0.003 microgram/kg body weight
- No reported deliberate brucellosis poisoning
- Theoretical epidemic – 1g aerosolized botulinum toxin 5 million
- Water-borne and food-borne routes also feasible, occur in conjunction with aerosolization

Brucellosis treatment

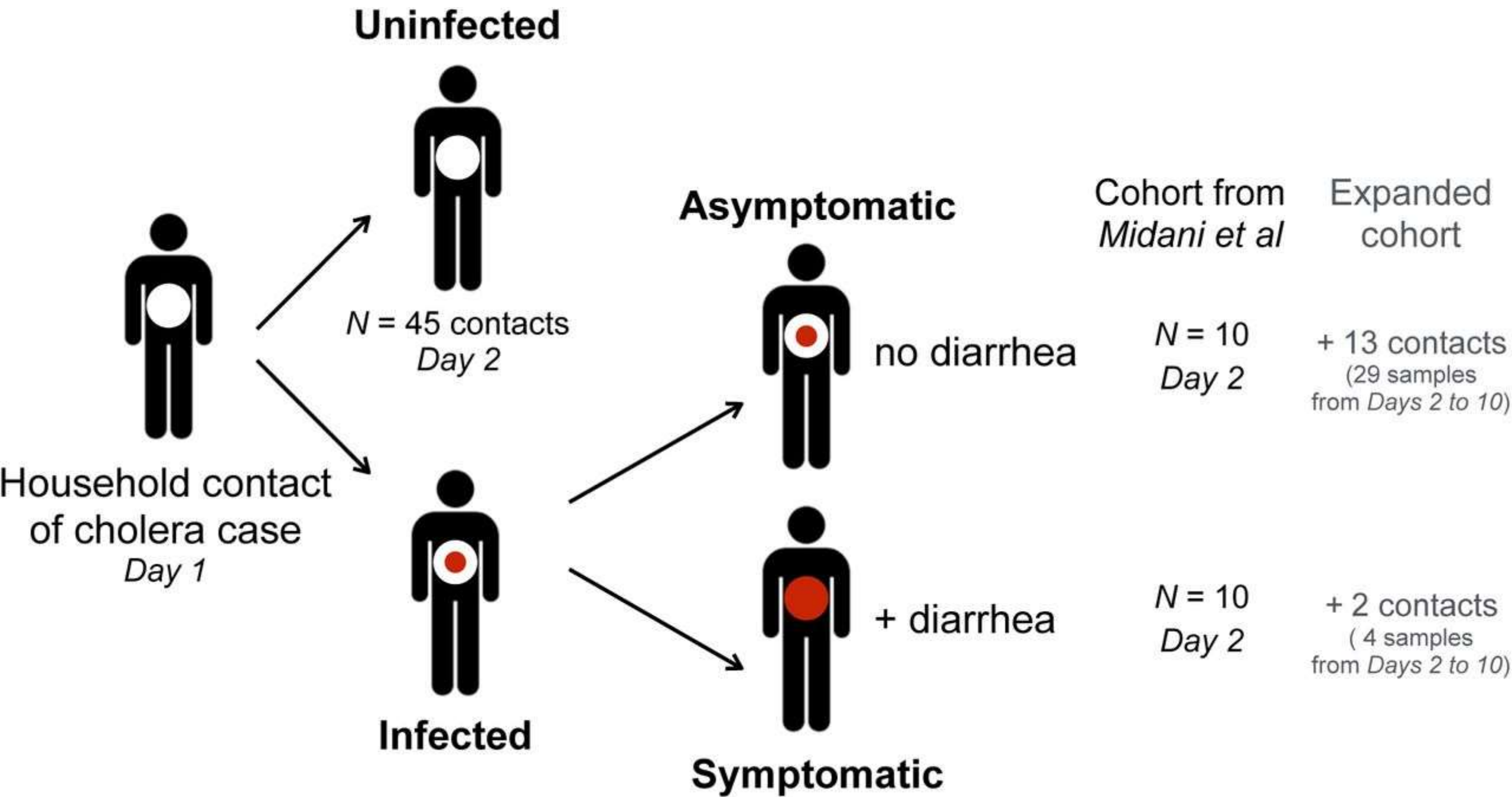
- There is no vaccine
- Doxycycline can be used as the first line of therapy
- Ciproflaxacin and rifampin can be used in the second line of therapy

Hemorrhagic fever

- Infection usually occurs when the skin is torn or through a percutaneous injury that enters the mucous membranes or respiratory tract.
- Human-to-human transmission occurs primarily through unprotected contact with blood and bodily fluids.
percutaneous injuries associated with high propagation velocities (e.g., needle stick)
- Several VHF viruses have been reported to be used as weapons by Russian and US forces.
- A major problem with bioterrorism is the inhalation of *Coxiella burnetii*, which, when inoculation rates are low, presents only as fever and cough until severe pneumonia and high inoculation rates. (A.F.2007)

Cholera

- Cholera is a severe diarrheal disease caused by the gram-negative bacterium *Vibrio cholera*, which contaminates water and food and can potentially be used as a weapon of bioterrorism.
- The National Institute of Allergy and Infectious Diseases (NIAID) has classified *V. cholerae* as a Category B pathogen that poses a potential bioterrorism threat.
- Isolation is not required. The person you shared food or drink with Cholera patients should be observed for five days, and stool or contaminated objects should be removed. Vomit must be disinfected before reuse. Faeces and vomit do not need to be disinfected if: It is discharged into the general sewage system. N. A. (2009).



CHOLERA TREATMENT

- Treatment of cholera infection is oral or parenteral fluid.
- Oral tetracycline or doxycycline should be used. If the patient is infected Strains resistant to tetracycline, ciprofloxacin or erythromycin can be used.

BIOLOGICAL TERROR EVENT

- Existence of vector-endured infection where there is no direction
- A bunch of appalling or dead animals
- A usual seasonality
- The earthly pattern of sickness
- More respirational appearance of the disease
- Unusual host factors
- Different attack rates in different areas
- Transmitted by unusual vector

IDEAL BIO TERROR FEATURES

An ideal bio terror would have the following features:

- Spreadable
- Infectious
- Tough
- Hard to identify
- Treatment-resistant
- Consumer manageable

No common agent encounters all of these measures. Thus, preferably or far ahead, the terrorist may plan unusual arms using artificial biology techniques to boost or change the features of early prevailing organisms or pollutants. Countermeasures must be pursued dynamically in improvement. (T., 2009)

Early detection system

- BIDS: biological integrated detection system
 - Genetic and antibody-based detection on suspected aerosol particles
- LRBSDS: long-range biological stand-off detection system
 - Detect aerosol clouds from a distance up to 30 km and can provide early-warning
- SRBSDS: short-range biological stand-off detection system
 - It uses ultraviolet and laser-induced fluorescence(T,J,.1997)

- A real-time outbreak surveillance system prepared for its 1995 debut. Collect facts from laboratories, infirmaries and environmental studies to perceive bioterrorism attacks as early as possible.
- Watt-Lorenz was established as a technology subsidiary of Wyatt with a unique operation. Provides an immediate warning system for biological agents of bioterrorism to protect people and objects from biotic and organic hazards. These bioterrorist threats often impact the isolated sector underpinnings extensive overlooked by the Department of Defense and Homeland Security.

Biological weapons affect animals, plants and biodegradable materials

- In the First World War, the British strategy was to use anthrax to destroy the German army's carriage capability - then still reliant on horses.
- The 1969-71 Southern Corn Blight eruption demolished 15% of the USA's maize harvest.
- The post-reunification German government supported research to biodegrade the plastic body of East German Trabant motor automobiles which constituted a store of ecologically unwanted organic material.

Concerns about biological weapons

- Panic of purposely aimed biological weapons arguably producing valuable volume to respond to “The Next Virus”.
- New R&D into pathogens, vaccine-making ability, and reinforced epidemiological surveillance targeted at biological weapons use have a direct and positive effect on civil and military readiness for Bioterror or Mother Nature’s next aberration. (P, S,,2007)

Biological weapons convention (BWC)

- Came into force; on 26 march 1975
- Prevention of growth, creation and store up of bacteriological and toxin arms and their devastation


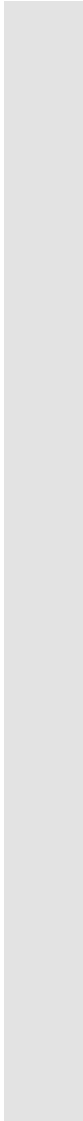
Has two articles

- Article 1: never in any condition to produce, store or attain items-microbial other biological agents or toxins and weapons, kit or means of delivery to use of such agents
- Article 2: debtor or distract to peaceful resolves all agents, toxins, weapons gear and all means of transfer within nine months of the pass into the settlement. (n.d.)

- Preparedness for natural disasters caused by infectious diseases is internationally unrest. Due to the ease and frequency of overseas travel, the pandemic will likely play a significant global effect. Multiple countries. We have the resources to respond to the current pandemic. Natural disasters with numerous casualties⁸⁵ Strategies to cope with natural disasters caused by infectious diseases Alone and jointly with the United States.

Conclusion

Preparedness for natural disasters related to infectious diseases is evolving day by day. The process by which objects and UIs are better prepared Effectively recognizes and responds to mass casualties involving biological agents.

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- As a Surveillance Specialist Epidemiology, indigenous people play an important role in hospitals/medical facilities. Facility and community readiness and is responsible for: Your ability to perceive and respond effectively increases. to an epidemic.

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